Appl. No. 09/601,004
Amdt. dated October 27, 2003
Reply to Office action of April 25, 2003

In the Claims:

Claims 1- 7 are amended herein.   New claim 8 is added.

1.   (currently amended)   A two variable data interpolation system, comprising a computer, wherein a value between a plurality of discrete data is interpolated by performing convolution operation corresponding to the plurality of discrete data positioned at equal intervals in a two dimensional space using a sampling function that ~~can be differentiated~~ is differentiable finite times and has values of a local support.

2.   (currently amended)   The two variable data interpolation system according to claim 1, wherein the sampling function is a function that can be differentiated only once over ~~the~~ a whole region.

3.   (currently amended)   The two variable data interpolation system according to claim 1, wherein, with letting a third order B spline function be F(t), the sampling function, (H(t), is defined as follows:

H(t) = -F(t + 1/2)/4 + F(t) - F(t - 1/2)/4.

4.   (currently amended)   The two variable data interpolation system according to claim 3, wherein the third order B spline function F(t) is expressed as follows:

$(4t^2 + 12t + 9)/4$; $-3/2 \le t < -1/2$

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$-2t^2 + 3/2$; $-1/2 \leq t < 1/2$

$(4t^22 - 12t + 9)/4$; $1/2 \leq t < 3/2\underline{.}$

5.   (currently amended) The two variable data interpolation system according to claim 1, wherein the sampling function is defined as follows:

$(-t^2 - 4t - 4)/4$; $-2 \leq t < -3/2$

$(3t^2 + 85 + 5)/4$; $-3/2 \leq t$ -1

$(5t^2 + 12t + 7)/4$; $-1 \leq t < -1/2$

$(-7t^2 + 4)/4$; $-1/2 \leq t < 1/2$

$(5t^2 - 12t + 7)/4$; $1/2 \leq t < 1$

$(3t^2 - 8t + 5)/4$; $1 \leq t < 3/2$

$(-t^2 + 4t - 4)/4$; $3/2 \leq t \leq 2\underline{.}$

6.   (currently amended) ~~The two variable data interpolation system according to claim 3~~ A two variable data interpolation system, wherein a value between a plurality of discrete data is interpolated by performing convolution operation corresponding to the plurality of discrete data positioned at equal intervals in a two dimensional space using a sampling function that is differentiable finite times and has values of a local support, wherein, with letting a third order B spline function be F(t), the sampling function, (H(t), is defined as follows:

H(t) = -F(t + 1/2)/4 + F(t) - F(t - 1/2)/4, comprising:

discrete data extracting unit for extracting a plurality of discrete data that exist within a predetermined range around a

data interpolating position that becomes an object of interpolation operation;

sampling function operating unit for calculating a value of the sampling function H(t) for each of a plurality of discrete data extracted in this manner, with letting distance between the data interpolating position and discrete data be a t; and

convolution operating unit for obtaining a value of the data interpolating position by performing convolution operation through adding values of the sampling function that are calculated by the sampling function operating unit and correspond to the plurality of discrete data respectively.

7.   (currently amended)   ~~The two variable data interpolation system according to claim 5,~~ A two variable data interpolation system, wherein a value between a plurality of discrete data is interpolated by performing convolution operation corresponding to the plurality of discrete data positioned at equal intervals in a two dimensional space using a sampling function that is differentiable finite times and has values of a local support,

wherein the sampling function is defined as follows:

$(-t^2 - 4t - 4)/4$; $-2 \le t < -3/2$

$(3t^2 + 85 + 5)/4$; $-3/2 \le t$ -1

$(5t^2 + 12t + 7)/4$; $-1 \le t < -1/2$

$(-7t^2 + 4)/4$; $-1/2 \le t < 1/2$

$(5t^2 - 12t + 7)/4$; $1/2 \le t < 1$

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$$(3t^2 - 8t + 5)/4 \qquad ; 1 \le t < 3/2$$

$$(-t^2 + 4t - 4)/4 \qquad ; 3/2 \le t \le 2,$$ comprising:

discrete data extracting unit for extracting a plurality of discrete data that exists within a predetermined range around a data interpolating position that becomes an object of interpolation operation;

sampling function operating unit for calculating the sampling function H(t) for each of a plurality of discrete data extracted by the discrete data extracting unit, with letting distance between the data interpolating position and each discrete data be a t; and

convolution operating unit for obtaining a value of the data interpolating position by performing convolution operation through adding values of the sampling function that are calculated by the sampling function operating unit and correspond to the plurality of discrete data respectively.

8. (new) A two variable data interpolation system, comprising:

discrete data extracting unit for extracting a plurality of discrete data that exist within a predetermined range around a data interpolating position that becomes an object of interpolation operation;

sampling function operating unit for calculating a value of the sampling function that can be differentiated finite times and

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has values of local support for each of a plurality of discrete

data extracted in this manner, based on distance between the data

interpolating position and discrete data; and

convolution operating unit for obtaining a value of the data

interpolating position by performing convolution operation

through adding values of the sampling function that are

calculated by the sampling function operating unit and correspond

to the plurality of discrete data respectively.